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childhood and adult life. They spoke of themselves as always being "nervous," were usually quiet and unsociable except when under the influence of alcohol or drugs, had difficulty in securing and holding positions, had a tendency to have hallucinations, and displayed marked feelings of inferiority.

One individual was observed who might be regarded as a fatuous type of personality. She was not seclusive, and she did well on the Binet examination, yet her conduct had been characterized at all times under observation by a childish lack of judgment and an immature sense of responsibility.

It seems that the feeling of inferiority is found with great frequency in prostitutes, and it probably plays a considerable part in determining the individual to take up prostitution. It may at first seem surprising that a shy and bashful girl would engage in this life; but it is believed that this frequently occurs, and it is probably explainable on the ground that the part of the female in prostitution is so nearly passive and requires the exercise of so little intelligence.

In this study little consideration was given to the statement of any individual as to why she began sexual immorality; practically all such statements probably represent a rationalization rather than the real reason.

(Part III of these studies, dealing with the investigations into the social and environmental factors, which were made by the representative of the Children's Bureau, will appear in the next issue of Public Health Reports.)

WHAT CAN A COMMUNITY AFFORD TO PAY TO RID ITSELF OF MALARIA?

By L. M. Fisher, Associate Sanitary Engineer, U. S. Public Health Service.

Upon the intelligent understanding of the financial problem involved in malaria eradication will largely depend the rate of progress with which the malarious sections of the country will be cleared up. In places where health work has been backward the health authorities probably do not realize that the community will tax itself very heavily to be assured of good health, provided it has confidence in the ability of the health authorities to do what they say is necessary to clean up the community. Good health is the greatest human asset. The extent to which this is appreciated by the average man is indicated by the fact that advertising concerns find it profitable to make health the "appeal" in a large percentage of the advertising matter put out. Hugo Munsterberg, in his "Psychology of Business," says: "Psychological experiments in which advertisements with different feeling-appeals were graded by 20 men and 20 women showed on an average that the idea of health appealed to the personality most strongly. Next comes cleanliness * * * ." This is an indication of the extent to which health authorities can draw upon public support when confidence is established by the results accomplished.

A man in a desperate situation will pay any sum to escape from it. The only requirement is that it must offer at least a faint chance of success. If his situation is less desperate, he will consider the money cost more in detail; it becomes then a question of relative values.

If a community has much malaria and possesses little money, it can afford to spend little on malaria, for other demands upon its funds can not be ignored. It must provide for its means of livelihood first. It must finance agriculture, industry, commerce, transportation, and keep business as active as possible. The money a community spends on malaria control should be considered as an investment. *Whether it is a good or a bad investment depends upon the money returns realized, just as in the case of any other investment.* The more intelligent and public-spirited a community is, the quicker will it be to sense the value of a good investment in malaria-control work.

The economic significance of malaria has probably not been fully realized by many people. The insidious losses do not attract marked attention, since they are practically an everyday occurrence and comparatively few people die of malaria. The losses occur in little leaks. Personal efficiency is reduced. The business man is not fully alive to his opportunities. The laborer can not render full value for his wages. His employer loses thereby and may attempt to recoup his losses by reducing the pay for labor, thus passing the loss on to the employee. The professional man suffers like the business man—from decreased personal efficiency. In addition, both suffer from the smaller volume of business and from poorer collections because of the reduced prosperity of the community. The manufacturer loses because of the lowered efficiency of the operative, and because of idle machines due to illness of the employees. The railroads lose because the community does not produce the freight it would produce if every worker were fully efficient.

Time is important in the computation of the amount of this loss. If a cotton mill, for instance, produces 5,000 pounds less of manufactured goods a day than it would produce if there were no malaria, it loses daily the profit that it would make on manufacturing 5,000 pounds of goods. The laborers lose each day the compensation they would receive for manufacturering 5,000 pounds of finished product. The railroad loses the revenue it would earn each day by hauling 5,000 pounds of freight from the community. The merchants lose because there is less money to spend that day. The doctor loses because the wage earner must spend his money for the necessities of life, leaving little or nothing for family medical atten tion. The children, who are the first in the community to suffer, acquire a defective education because of lost days at school as well as inefficient days. This handicap projected over a period of years in the lifetime of the individual may become very formidable in dollars and cents. It is not practicable to name a definite figure indicative of this loss. The community, however, realizes that it is a very real loss.

The farmer loses a portion of his crops because his laborer is in bed or only partly efficient. Some of the family lose time nursing the sick; money is spent for quinine and other medicines, for screens, mosquito lotions, chill tonics, and so forth.

The property owner loses because of depreciated property values and low rents.

If all these losses are figured up for the year and capitalized, the result indicates from an economic and commercial viewpoint the amount to which the community would be justified in making a cash expenditure or in issuing bonds to effect permanent relief. From the result thus obtained, a sum must be deducted, the interest on which would pay for the maintenance charges on the permanent work.

Thus if the losses above mentioned should amount to, let us say, $8,000 a year for the community, figuring interest and sinking fund charges at 8 per cent, they would be capitalized at $100,000. Now if maintenance of ditches, etc., should cost $2,400 a year, this sum capitalized with interest at 8 per cent would amount to $30,000. The community would, therefore, be justified in bonding itself for $70,000, or in raising and spending $70,000 in cash. Whatever additional value the community would place upon the comforts of being free from mosquitoes and enjoying a reputation as a healthful, energetic, enterprising town, could be added to the sum of $70,000.

The enormous drain that malaria puts upon the resources of a community leads to discouragement, and enterprising persons will abandon the locality. What may be called a deterioration in the quality of the population is thus accentuated.

Carter, observing that this deterioration is progressive, said, in effect, that in a country where malaria is prevalent, the control of malaria is more important than the control of all other communicable diseases, including smallpox, cholera, bubonic plague, yellow fever, typhoid fever, dysentery, etc.; that the population would move out of a malarious country and would not return, whereas the people would return after the passing of a yellow fever epidemic or after cholera or plague; in short, that malaria ruined a country, financially.

If, in the above assumption, the community contained a population of 3,000, the per capita first cost would amount to about $23; but if the results sought, namely, the elimination of malaria, were accomplished, the expenditure would undoubtedly be justified, although the per capita cost would be high.

The first cost for malaria-control work varies widely for different communities. In some localities it may amount to possibly some figure like $1.50 per capita; in others it may amount to 20 times as much, or even more. *It may even amount to a figure which would make it cheaper to abandon the property created by the community and let the people move away, rather than pay the cost of eliminating malaria.* In such a case decision must be made between continuous malarial infection or abandonment of the property which the industry of the community has created. The community is thus caught on the two horns of the dilemma. Some communities have, perhaps, been abandoned, where control measures, intelligently applied, would have cost less than the value of the property abandoned; but they were abandoned because of the fact that knowledge of just what was necessary to be done did not exist.

The best course to pursue, from a purely economic standpoint, depends in any case upon three factors: the annual community loss, the first cost of permanent work, and the cost of maintenance. This may be expressed exactly by the following mathematical formulæ:

(1) Let P = population in the community, and
(2) C = per capita first cost of malaria-control work; then
(3) PC = total cost of the work.
(4) Let I = interest and sinking fund charge in per cent; then
(5) PCI = total annual interest and sinking fund charge in dollars.
(6) Let M = maintenance in per cent of first cost; then
(7) PCM = total annual maintenance charge, and
(8) $PCI+PCM$ = total annual cost, interest, and maintenance.
(9) Let R = per cent of population infected; then
(10) PR = number of infected persons in the community.
(11) Let V = annual loss in dollars per person infected; then
(12) PRV = total annual loss to the community before control, and
(13) $PRV-(PCI+PCM)$ = total saving for community $= P\,[RV-C\,(I+M)]$;
(14) $\frac{PRV-(PCI+PCM)}{P}$ = net average annual gain per capita $= RV-C\,(I+M)$; and
(15) $\frac{\frac{PRV-(PCI+PCM)}{P}}{C}$ = annual dividend to community on first cost $= \frac{RV}{C}-(I+M)$.

Now, if only partial control is effected, and we let

(16) F = the percentage of control, such as 65%, 80%, 90%, etc., then equation (12) becomes
(17) $PRVF$ = average annual saving under partial control; this factor F will appear in each of the remaining equations, and equation (15) will take the form
(18) $\frac{RVF}{C}-(I+M)$ = annual dividend to community on first cost.

From this equation it is evident that the dividend varies directly as the percentage of the population infected, directly as the loss per person infected, directly as the percentage of control, and inversely as the per capita first cost, i. e., the greater the infection, the greater the dividend; the greater the annual loss per person infected, the greater the dividend; the greater the percentage of control, the greater the dividend; and the less the first cost, the greater the dividend. The percentage of infection alone does not determine the wisdom of undertaking the work, nor does the per capita cost, but both must be considered together.

Now, if we take two communities, A and B, equal in population, and assume interest charges the same in both places, the annual maintenance a fixed percentage of the first cost in each place, the annual loss per person infected the same in each place, and 100 per cent reduction in each place, but with only 10 per cent of the population infected in A and 85 per cent in B, and with a per capita cost of only $1.50 in A whereas it is $10 in B, then, substituting these values in equation 18, we have

$$\text{Dividend for A} = \frac{10 \times 5}{1.50} - (8 + 7) = 18.3 \text{ per cent, and}$$

$$\text{Dividend for B} = \frac{85 \times 5}{10} - (8 + 7) = 27.5 \text{ per cent.}$$

These results are only illustrative, but they indicate that the dividends on the first cost in the case of B are greater than they are for A, although the per capita cost for B was very much greater than that for A.

Therefore, in order to arrive at an intelligent decision as to the profit of proposed malaria work in a community, the first requirement is that a malaria census be taken to determine the approximate annual loss suffered because of malaria. The next step should be the preparation of an estimate of first cost and that of annual maintenance. From formula (18) the annual average dividend could be approximated.

The sum that a community could *afford* to pay on the above assumptions may be very materially greater than the sum it is *willing* to pay.

AN INTENSIVE COURSE OF INSTRUCTION ON SYPHILIS.

The Rochester Health Bureau is giving an intensive course of instruction in regard to syphilis, at the State General Hospital and Dispensary. This course will include—

1. The history and municipal control of syphilis.
2. Clinical lectures and demonstrations.

The course of clinical lectures and demonstrations will include—

(*a*) Early diagnosis.

(*b*) Taking of blood and demonstration of the technique for Wassermann examination.